

WHAT IS CLAIMED IS:

1. An identifying nucleotide or identifying combination of nucleotides of 16s ribosomal RNA or 16s ribosomal DNA as set forth in Table 2 present in a *Shigella* species and not present in *E. coli*.

5 2. An identifying nucleotide or identifying combination of nucleotides of 16s ribosomal RNA or 16s ribosomal DNA as set forth in Table 2 present in *E. coli* and not present in a *Shigella* species.

10 3. An identifying nucleotide or identifying combination of nucleotides of 16s ribosomal RNA or 16s ribosomal DNA as set forth in Table 2 present in one species selected from the group consisting of *Shigella sonnei*, *Shigella flexneri*, *Shigella boydii*, and *Shigella dysenteriae*, and not present in the other species of *Shigella* and not present in *E. coli*.

15 4. The nucleotide or combination of nucleotides of Claim 1 or 3 present in *Shigella sonnei*.

20 5. The nucleotide or combination of nucleotides of Claim 4 wherein the identifying nucleotide is a C at position 964 or a deletion at position 978.

25 6. The nucleotide or combination of nucleotides of Claim 1 or 3 present in *Shigella dysenteriae*.

7. The nucleotide or combination of nucleotides of Claim 6 wherein the identifying nucleotide is an A at position 76.

25 8. The nucleotide or combination of nucleotides of Claim 1 or 3 present in *Shigella boydii*.

30 9. The nucleotide or combination of nucleotides of Claim 8 wherein the identifying nucleotide is a C at position 92.

10. The nucleotide or combination of nucleotides of Claim 2 wherein the identifying nucleotide is a T at position 88p.

5 11. A purified nucleic acid molecule capable of hybridizing to a 16s rRNA region or a 16s rDNA region having a genus-specific nucleotide of *Shigella* and not to an equivalent 16s rRNA region or 16s rDNA region of *E. coli*, or a nucleic acid molecule complementary to said molecule, the molecule thereby capable of distinguishing *Shigella* from *E. coli*.

10 12. A purified nucleic acid molecule capable of hybridizing to a 16s rRNA region or a 16s rDNA region having a genus-specific nucleotide of *E. coli* and not to an equivalent 16s rRNA region or 16s rDNA region of a *Shigella* species, or a nucleic acid molecule complementary to said molecule, the molecule thereby capable of distinguishing *E. coli* from *Shigella* species.

15 13. A purified nucleic acid molecule capable of hybridizing to a 16s rRNA region or a 16s rDNA region having a *Shigella sonnei*-, *Shigella flexneri*-, *Shigella boydii*-, or *Shigella dysenteriae*-specific nucleotide, and not to an equivalent 16s rRNA region or 16s rDNA region of the other *Shigella* species, or a nucleic acid molecule complementary to said molecule, the molecule thereby capable of distinguishing *Shigella* species.

20 14. The molecule of Claim 13 wherein the region has a *Shigella sonnei*-specific nucleotide selected from the group consisting of a C at position 964, and a deletion at position 978, the molecule thereby capable of distinguishing *Shigella sonnei*.

25 15. The molecule of Claim 13 wherein the region has a *Shigella dysenteriae*-specific nucleotide A at position 76, the molecule thereby capable of distinguishing *Shigella dysenteriae*.

16. The molecule of Claim 13 wherein the region has a *Shigella boydii*-specific nucleotide C at position 92, the molecule thereby capable of distinguishing *Shigella boydii*.

30 17. A first and a second purified nucleic acid molecule combination, the first capable of hybridizing to a first 16s rRNA region or 16s rDNA region as set forth in Table 2, the second

capable of hybridizing to a second 16s rRNA region or 16s rDNA region as set forth in Table 2, the combination of molecules thereby capable of distinguishing *E. coli*, or a *Shigella* species, or a nucleic acid molecule combination complementary to said first and second molecules.

5 18. The combination of nucleic acid molecules of Claim 13 wherein the first molecule hybridizes to a *Shigella flexneri* region containing a G nucleotide at position 79, and the second molecule hybridizes to *Shigella flexneri* region containing a G nucleotide at position 89 or to *Shigella flexneri* region containing a C nucleotide at position 92p.

10 19. A purified nucleic acid molecule having a nucleotide sequence as set forth in SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, or SEQ ID NO: 6, or a nucleic acid complementary to said purified molecule.

15 20. A purified nucleic acid molecule having a nucleotide sequence as set forth in SEQ ID NO: 9, SEQ ID NO: 10, SEQ ID NO: 11, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 17, SEQ ID NO: 18, SEQ ID NO: 19, SEQ ID NO: 20, or SEQ ID NO: 21; or a nucleic acid molecule complementary to said purified molecule.

20 21. A method for testing an unknown sample suspected of having *E. coli* or *Shigella* species presence comprising
demonstrating an identifying nucleotide or identifying combination of nucleotides of 16s rRNA or 16s rDNA as set forth in Table 2 within the sample
wherein the demonstration of an identifying nucleotide or identifying combination of nucleotides establishes presence or absence of *E. coli* or *Shigella* in the sample.

25 22. The method of Claim 21 wherein the demonstrating is by a method selected from the group consisting of direct sequencing, dot blot hybridization, solution hybridization, Northern blotting, and Southern blotting of the unknown sample.

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23. The method of Claim 21 wherein the unknown sample is suspected of containing *E. coli* and the identifying nucleotide is a T at position 88p.

24. The method of Claim 21 wherein the unknown sample is suspected of containing *Shigella sonnei* and the identifying nucleotide is a C at position 964, or a deletion at position 978.

25. The method of Claim 21 wherein the unknown sample is suspected of containing *Shigella dysenteriae* and the identifying nucleotide is an A at position 76.

10 26. The method of Claim 21 wherein the unknown sample is suspected of containing *Shigella boydii* and the identifying nucleotide is a C at position 92.

15 27. The method of Claim 21 wherein the unknown sample is suspected of containing *Shigella flexneri* and the identifying nucleotide is a G nucleotide at position 79 in combination with a G at position 89 or a C at position 92p.

28. The method of Claim 21 wherein the unknown sample is a clinical sample for diagnosis.

20 29. The method of Claim 21 wherein the unknown sample is a food sample.

30. The method of Claim 21 wherein the unknown sample is an environmental sample.

25 31. An assay kit for distinguishing *Shigella* from *E. coli* comprising the purified nucleic acid molecule of Claim 11 packaged in at least one container.

32. An assay kit for distinguishing *E. coli* from *Shigella* comprising the purified nucleic acid molecule of Claim 12 packaged in at least one container.

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33. An assay kit for identifying *Shigella sonnei* comprising the purified nucleic acid molecule of Claim 14 packaged in at least one container.

34. An assay kit for identifying *Shigella flexneri* comprising the combination of nucleic acid molecules of Claim 18 packaged in at least one container.

5 35. An assay kit for identifying *Shigella boydii* comprising the purified nucleic acid molecule of Claim 16 packaged in at least one container.

10 36. An assay kit for identifying *Shigella dysenteriae* comprising the purified nucleic acid molecule of Claim 15 packaged in at least one container.

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